United States Patent

Lee

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[54] ARCHERY BOW TUNING AND STABILIZING ATTACHMENT

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[21] Appl. No.: 48,665

Related U.S. Application Data

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[52] U.S. Cl. ..... 188/1 B

[51] Int. Cl. F16f 7/10

[58] Field of Search ..... 124/23, 24; 188/1 B

[56] **References Cited**

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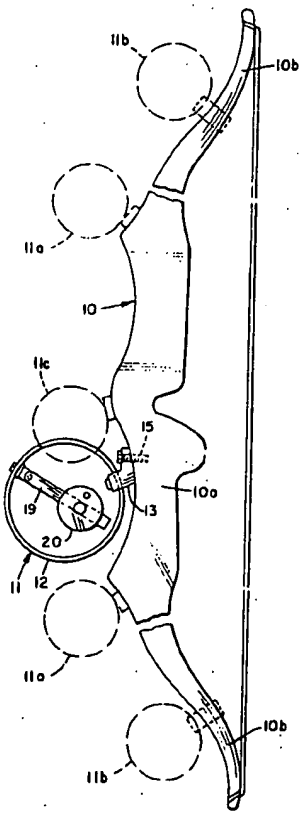
[57] **ABSTRACT**

A torque ring adjustably secured at a selected point to an archery bow. A tuning bar has one end thereof universally adjustably secured to the torque ring and has a weight adjustably mounted thereon. The tuning bar is resiliently flexible for oscillation with the weight in any selected plane with respect to the plane of the bow, under shock transmitted from the bow to the torque ring.

6 Claims, 9 Drawing Figures



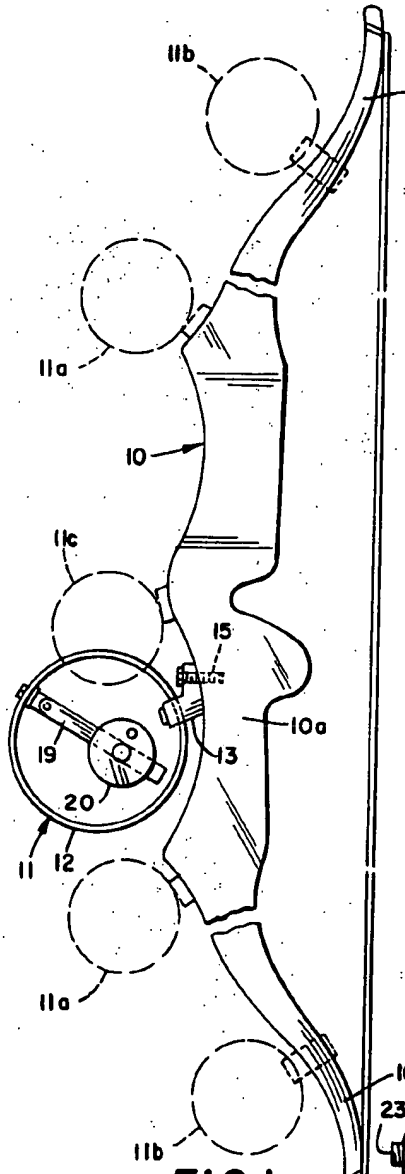


FIG. 1.

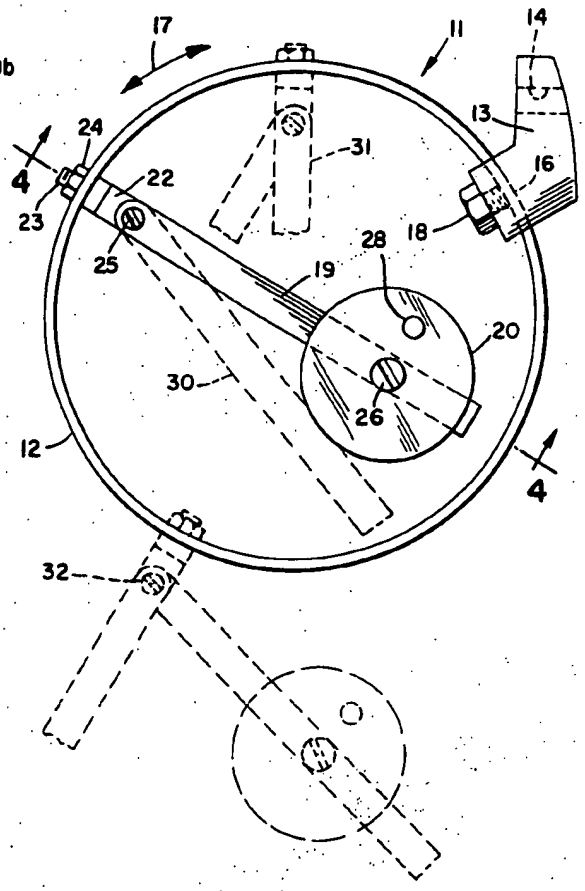


FIG. 3.

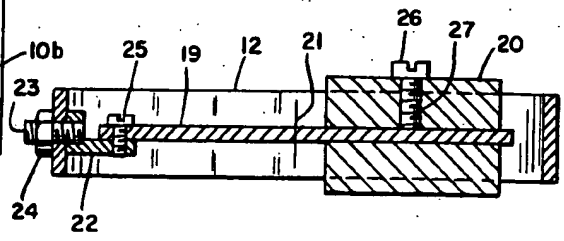


FIG. 4.

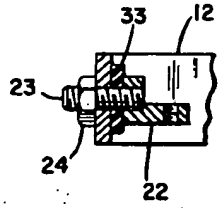


FIG. 5.

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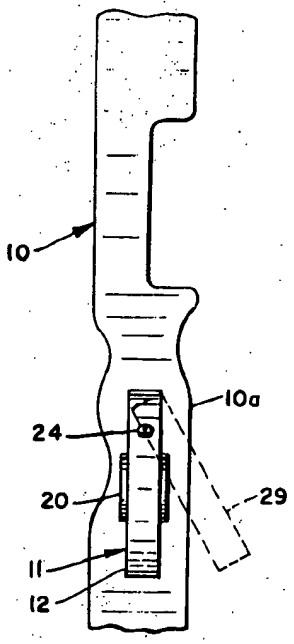

FIG. 2.

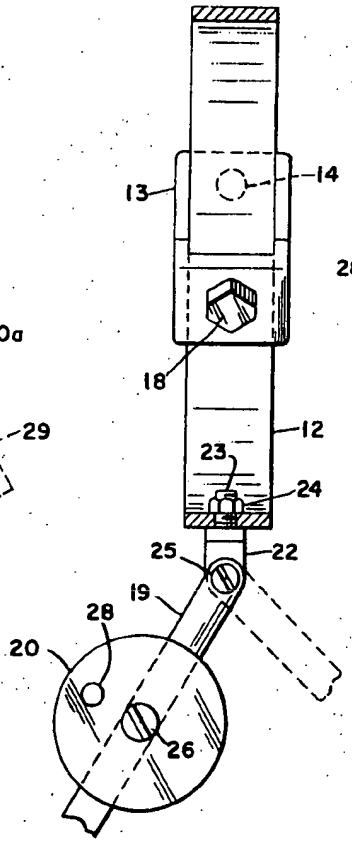

FIG. 6.

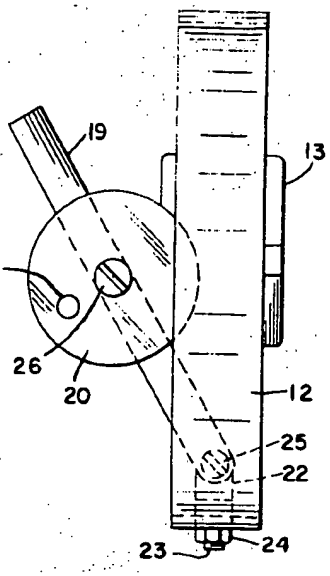

FIG. 7.

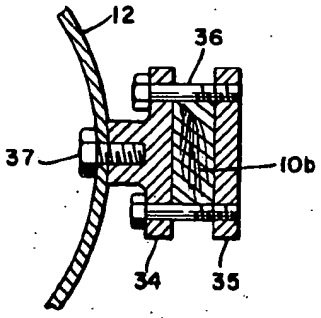

FIG. 9.

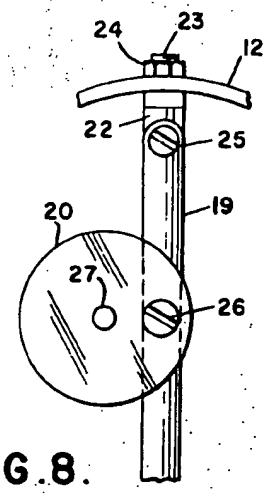

FIG. 8.

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ARCHERY BOW TUNING AND STABILIZING ATTACHMENT

The present application is a division under Rule 147 of my application Ser. No. 772,075, filed Oct. 31, 1968, now U.S. Pat. No. 3,525,822.

This invention relates to new and useful improvements in archery bows, and in particular the invention concerns itself with a bow attachment which is capable of efficiently translating the stored energy of a drawn bow into arrow thrust, whereby to reduce energy loss, minimize shock to the archer's arm, and eliminate the tendency of the bow to jump, cant, or rotate.

It is generally known that the provision of a mass moment of inertia on the handle portion of a bow has beneficial effects, and the principal object of the invention is to provide a bow attachment which includes a mass or weight carried by an oscillatory tuning bar, the mass inertia being effective to control vibration, absorb shock, stabilize the bow, and produce an increased arrow thrust, as above outlined.

Briefly, the attachment of the invention also includes a torque ring to which one end of the tuning bar is secured by an adjustable, universal connection, and adjustable mounting means for the torque ring at a selected point on the bow, the arrangement being such that the tuning bar with its weight may be set for oscillation in any desired plane relative to the plane of the bow. Also, the weight itself is adjustable on the tuning bar to afford a desired frequency and amplitude of oscillation in any selected plane, whereby the inertial effect of the weight may be utilized to the best advantage.

The device of the invention is simple in construction, efficient in operation, attachable to any conventional bow, and capable of economical manufacture.

With the foregoing more important object and features in view and such other objects and features as may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference are used to designate like parts, and wherein:

FIG. 1 is a side elevational view of an archery bow with the attachment of the invention in situ thereon, various other possible locations of the attachment being shown by dotted lines;

FIG. 2 is a fragmentary front elevational view of the bow with the attachment;

FIG. 3 is an enlarged elevational view of the attachment per se;

FIG. 4 is a cross-sectional view, taken substantially in the plane of the line 4—4 in FIG. 3;

FIG. 5 is a fragmentary sectional detail showing a slightly modified connection of the tuning bar to the torque ring;

FIG. 6 is a fragmentary view, partly in section and partly in elevation, showing the tuning bar and weight outside the torque ring;

FIG. 7 is an elevational view of the attachment in another, differently adjusted position;

FIG. 8 is a fragmentary elevational view showing the weight in a differently adjusted position on the tuning bar; and

FIG. 9 is a fragmentary sectional detail showing a modified form of the torque ring mounting means.

Referring now to the accompanying drawings in detail, the numeral 10 generally designates a conventional archery bow, having the bow tuning and stabilizing attachment 11 mounted on the handle portion 10*a* thereof. Preferably, although not necessarily, the attachment is mounted on the handle portion near the center thereof, but depending upon an individual archer's preference, two smaller attachments may be used as indicated at 11*a*, 11*a* adjacent the ends of the handle portion, or two such smaller attachments may be mounted as at 11*b*, 11*b* near the ends of the limbs 10*b* of the bow. Also, if desired, the two smaller attachments at either the locations 11*a* or 11*b* may be used in conjunction with a third small attachment at a location 11*c* near the center of the handle portion 10*a*, in order to attain what may be referred to as the triangulation principle.

In any event, as illustrated in FIGS. 3 and 4, each attachment comprises a torque ring 12 in the form of an annular band, which is adjustably secured to the bow 10 by mounting means such as, for example, a mounting block 13, the latter having an aperture 14 for reception of a suitable screw 15 (see FIG. 1) for securing the block to the bow. The block 13 also has a slot 16 through which the ring 12 is slidably adjustable in a circumferential direction as indicated at 17, the ring being locked in a selected, adjusted position relative to the block 13 by a suitable set screw 18, as will be readily apparent.

A tuning bar 19 is secured at one end thereof to the ring 12 and carries a weight 20, the bar being resiliently flexible and capable of oscillation with the weight, for example as indicated at 21 in FIG. 4. The bar 19 is connected to the ring 12 by a universal connection of any suitable type which, for illustrative purposes has been shown as comprising an L-shaped bracket 22 provided with a screw-threaded stud 23 which extends through an aperture in the ring 12 and carries a nut 24 for securing the bracket in place. The bar 19 is attached to the bracket 22 by a screw 25 and the universal connection in this arrangement is obtained by adjusting the bar 19 laterally about the axis of the screw 25 and/or turning the bracket 22 about the axis of the stud 23.

The weight 20 is slidably adjustable along the length of the bar 19 and is locked in a selected position by a set screw 26 disposed in a screw-threaded aperture 27 at the center of the weight. However, the weight may also be provided with an eccentric aperture 28 for the screw 26, so that the weight may be secured to the bar in eccentric relation, as shown in FIG. 8.

Virtually infinite adjustments are possible in order that the tuning bar 19 with its weight 20 may oscillate in any desired plane relative to the plane of the bow 10, and some of these are shown for illustrative purposes in the drawings. First, the ring 12 may be secured in any desired location on the bow, as already mentioned. Second, the mounting block 13 may be fastened to the bow by the screw 15 so that the ring 12 is either aligned longitudinally with the bow as shown by the full lines in FIG. 2, or that it is angularly offset by any angular deviation to either side of the bow, as exemplified at 29 in the same Figure. Third, by loosening the set screw 18 in the mounting block 13, the ring 12 may be slid circumferentially through the block as indicated at 17, whereby the point of connection of the bar 19 to the ring may be moved circumferentially closer to or further away from the mounting block, so that shock transmitted by the bow has to travel a lesser or a greater distance along the ring before reaching the tuning bar. In this regard it is to be noted that the torque ring inherently possesses a certain amount of resiliency, so that the transmitted shock is dampened to a greater or lesser degree during its passage along the ring, depending on the length of travel.

Fourth, the position of the weight 20 longitudinally on the bar 19 may be adjusted so as to provide for a lesser or greater frequency and amplitude of oscillation in any selected plane, as afforded by a fifth adjustment of the universal connection 23, 24 of the bar 19 to the ring 12, which permits oscillation of the bar 19 in a plane parallel to the ring, or transversely of the ring, or in any other angular relationship to the ring. As for example, in FIG. 4 the bar 19 may oscillate as at 21 in a plane parallel to the ring axis, but if the bracket 22 is turned through 90° about the stud 23, the bar may oscillate in a plane transverse to the ring axis.

Fifth, by loosening the screw 25 the bar 19 may be adjusted from a diametrically extending or central position in the ring 12 as shown by the full lines in FIG. 3 to a laterally offset position exemplified by the dotted lines 30, and here again infinite variations in adjustment are possible in all different planes. The same Figure (3) also exemplifies by the dotted lines 31 a different position of the bar 19 attained by the aforementioned circumferential adjustment of the ring 12 in the mounting block 13, and it additionally shows a sixth possible adjustment where, as indicated at 32, the parts have been reversed so as to place the bar 19 with its weight 20 on the outside, rather than the inside of the ring 12. This may be obtained by

simply inserting the stud 23 through the ring from the outside and placing the nut 24 on the stud at the inside of the ring, so that the bracket 22, the bar 19 and the weight 20 are disposed externally of the ring for oscillation of the bar and weight in any selected plane relative to the ring itself, as exemplified in FIG. 6.

It will be apparent from the foregoing that three-dimensional facilities are provided for locating the weight anywhere in a sphere represented by the inside of the ring 12 and the length of the bar 19, and also anywhere in a hemisphere located anywhere around the outside of the ring. The total effect of the various spherical, lateral, vertical, horizontal and rotary adjustments enables the archer to locate the mass moment of inertia at the exact point or points best suited for his purpose in establishing a center of gravity, bow cant, inclination and torque resistance to enhance his personal style of holding the bow and releasing the arrow. Also, it is possible to control the weight reaction to shock in an infinitely variable degree so that the weight will oscillate with the desired frequency and amplitude, regardless of the location of the weight.

The path of weight oscillation may be adjusted from a single plane arc to an elliptical form of movement by mounting the weight 20 eccentrically on the bar 19 as shown in FIG. 8, thus creating an out of balance condition which will cause the weight to move in an elliptical path when subjected to shock. This ability to change the direction and form of oscillation becomes of importance when considered in connection with the facts that every archer has a unique technique and every bow has its own length, speed, force and path of limb motion. The device of the invention serves to compensate for faults of the archer being transmitted through the bow to affect the course and speed of the released arrow. Conversely, the device serves as insulation against shock and flutter of a sensitive bow reaching the archer's hand, with possible resulting shock, shaking, flinching and jerking arrow release.

FIG. 5 shows a small modification of the connection of the tuning bar mounting bracket 22 to the ring 12, wherein a washer 33 of rubber, plastic, fiber or other resilient material has been provided on the stud 23 between the bracket and the ring to afford a cushioning effect.

If the device is to be mounted on the limb portion 10*b* of the bow which is relatively thin and not well suited to accommodate a screw such as the mounting screw 15 of the block 13, a clamp-type mount may be employed as shown in FIG. 9, wherein the bow limb portion 10*b* is clamped between a pair of clamp members 34, 35 by screws 36 and the ring 12 is secured to one of the clamp members by a screw 37, as will be clearly apparent.

While in the foregoing there have been shown and described the preferred embodiments of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure and various modifications and equivalents may be resorted to, falling within the spirit and scope of the invention as claimed.

What is claimed as new is:

1. A tuning and stabilizing attachment for an archery bow, said attachment comprising in combination, mounting means adapted to be secured at a selected point to a bow, a torque ring supported by said mounting means, a resiliently flexible tuning bar secured at one end thereof to said torque ring, a weight carried by said bar for oscillation therewith under shock transmitted to said ring from the bow and universally adjustable means securing said tuning bar to said torque ring whereby the bar may oscillate in a selected angular plane relative to the plane of the ring.

2. The device as defined in claim 1, wherein said universally adjustable means are securable to said torque ring so as to dispose said tuning bar with said weight selectively inside and outside the torque ring.

3. The device as defined in claim 1, together with means securing said weight to said tuning bar at a selected point longitudinally of the bar.

4. The device as defined in claim 1, wherein said torque ring is adjustable circumferentially in said mounting means whereby to vary the circumferential distance of the secured end of said tuning bar from the mounting means.

5. The device as defined in claim 1, wherein said tuning bar is adjustable at selected points about the circumference of said ring.

6. A tuning and stabilizing attachment for an archery bow, said attachment comprising in combination, mounting means adapted to be secured at a selected point to a bow, a torque ring supported by said mounting means, a resiliently flexible tuning bar secured at one end thereof to said torque ring, a weight carried by said bar for oscillation therewith under shock transmitted to said ring from the bow and means securing said weight selectively concentrically and eccentrically to said tuning bar.

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